TECHNICAL REPORT TITLE PAGE

1. REPORT NO.	2. REPORT DATE
MLR-95-3	June 1995
3. TITLE AND SUBTITLE	**4. TYPE OF REPORT & PERIOD COVERED**
Strength and Development of Concrete Based on Maturity and Pulse Velocity	Final Report from 1-95 to 6-95
5. AUTHOR(S)	**6. PERFORMING ORGANIZATION ADDRESS**
Chengsheng Ouyang Transportation Engineer Assoc.	Iowa Department of Transportation Materials Department 800 Lincoln Way Ames, Iowa 50010

7. ACKNOWLEDGEMENT OF COOPERATING ORGANIZATIONS

8. ABSTRACT

The effect of curing temperature, in the range of 4.4 to 22.8 degrees C (40 to 73 degrees F), on strength development was studied based on the maturity and pulse velocity measurements in this report. The strength-maturity relationships for various mixes using a Type I cement and using a Type IP cement, respectively, were experimentally developed. The similar curves for early age strength development of both the patching concrete, using a Type I cement with the addition of calcium chloride, and the fast track concrete, using a Type III cement and fly ash, have also been proposed. For the temperature ranges studied, the strength development of concrete can be determined using a pulse velocity measurement, but only for early ages up to 24 hours. These obtained relationships can be used to determine when a pavement can be opened to traffic. The amount of fly ash substitution, up to 30%, did not have a significant influence on the strength-maturity relationship.

9. KEY WORDS	10. NO. OF PAGES
Compressive strength, Concrete fast track, Fly ash, maturity, Modulus of rapture, patching Pulse velocity, traffic opening strength	29